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800

COMMUNICATION SYSTEM

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SERVICE PARTS MANUAL



SERVICE/PARTS MANUAL

800

COMMUNICATION SYSTEM

This manual contains preliminary service information. Complete service information and parts listing will be provided at a later date.

CESSNA AIRCRAFT COMPANY
WICHITA, KANSAS

NOVEMBER 1968

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-------------	---------------

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CONTENTS

Paragraph		Page
-----------	--	------

SECTION I - GENERAL INFORMATION

1.1	Introduction	1-1
1.2	Purpose	1-1
1.3	Specifications	1-1
1.4	Units and Accessories	1-2
1.5	Equipment Required But Not Supplied	1-4
1.6	Description of Units	1-4

SECTION II - INSTALLATION

2.1	Unpacking	2-1
2.2	Preinstallation Tests	2-1
2.3	Installation Requirements	2-2
2.4	Installation of Receiver-Transmitter and Mounting	2-2
2.5	Installation of Accessory Unit and Mounting	2-2
2.6	Installation of Control Unit	2-3
2.7	Installation of Antenna	2-3
2.8	Interconnection of Units	2-3
2.9	Postinstallation Check	2-3

SECTION III - OPERATION

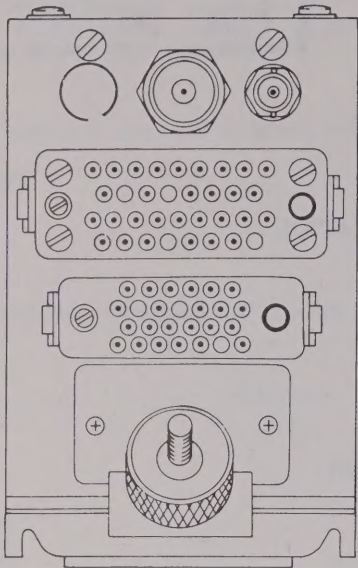
3.1	Operating Controls	3-1
3.2	Communication Operating Procedures	3-2
3.3	Self-Test Operating Procedures	3-2

ILLUSTRATIONS

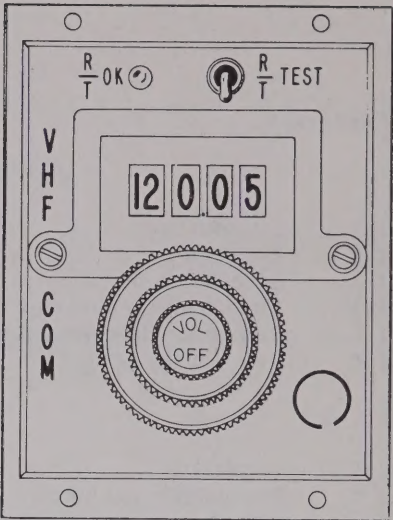
Figure		Page
1-1.	Cessna 800 Communication System	ii
2-1.	37260 Receiver-Transmitter with Mounting 36280, Installation Dimensions	2-4
2-2.	37260 Receiver-Transmitter with Mounting 36450, Installation Dimensions	2-4
2-3.	38500 Accessory Unit with Mounting 36320, Installation Dimensions	2-5
2-4.	38500 Accessory Unit with Mounting 34980, Installation Dimensions	2-5
2-5.	37250-1000 Control Units, Installation Dimensions	2-6
2-6.	37250-1000 Control Unit, Assembly Details	2-7
2-7.	37670-0000 Antenna, Installation Dimensions	2-8
2-8.	35180-0100 Antenna, Installation Dimensions	2-8
2-9.	Cessna 800 Communication System, Interconnection Diagram	2-9
3-1.	37250-1000 Control Unit	3-1

TABLES

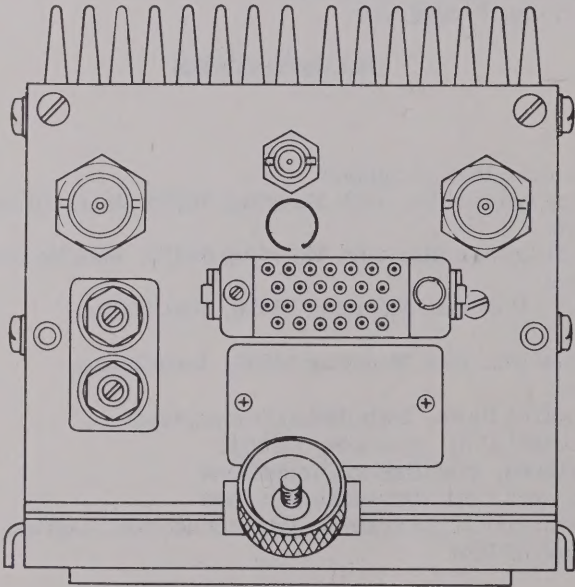
Table		Page
1-1.	Units and Accessories	1-3
3-1.	Operating Controls and Indicators	3-2



37260 RECEIVER-TRANSMITTER
WITH
MOUNTING 36450



37250-1000
CONTROL UNIT



38500 ACCESSORY UNIT
WITH
MOUNTING 34980

Figure 1-1. Cessna 800 Communication System Receiver-Transmitter, Control Unit and Accessory Unit

FCC LICENSING DATA

Application for an aircraft radio station license for all radio transmitters described in this manual must be made on FCC Form 404. In response to question No. 5 on both FCC Form 404-1 and FCC Form 404-2 (portions of Form 404), insert the data as follows for the applicable Cessna transmitter:

ANSWERS TO QUESTION NO. 5 ON FCC FORMS

NOMENCLATURE	MANUFACTURER	TYPE
CESSNA 800 COMMUNICATION SYSTEM RECEIVER-TRANSMITTER	Aircraft Radio Corporation Boonton, New Jersey, U. S. A.	RT 131A

SECTION I

GENERAL INFORMATION

1.1 INTRODUCTION

This manual contains installation and operation instructions for the Cessna 800 Communication System installed in Cessna Aircraft. The major units of the Cessna 800 Communication System are shown in figure 1-1.

1.2 PURPOSE

The Cessna 800 Communication System is a transistorized, remotely controlled communications system capable of receiving and transmitting voice communications on any of 720 channels between 118.00 and 135.975 MHz. The 720 channels are synthesizer controlled and are spaced 25 KHz apart. With the internal control stops removed, the system is capable of operation on 800 channels between 116.00 and 135.975 MHz.

1.3 SPECIFICATIONS

General Characteristics

Frequency Range: 118.00 to 135.975 MHz

Number of Channels: 720

Channel Spacing: 25 KHz

Tuning: Remote, simplex, digital readout

Input Power Requirement:

Receive: 1.5 amperes at 27.5 volts dc

Transmit: 7 amperes at 27.5 volts dc

Weights and Dimensions: See Figures 2-1 through 2-5

Certification:

37260 Receiver-Transmitter: TSO-C37b Class II, Env. Cat. ^A_D^A_BAAAE

Cessna 800 Communication System

	TSO-C38b Env. Cat.	$\frac{A}{D} \frac{A}{B} AAAE$
38500 Accessory Unit:	TSO-C37b Class II, Env. Cat.	$\frac{A}{D} \frac{A}{B} AAAE$
	TSO-38b Env. Cat.	$\frac{A}{D} \frac{A}{B} AAAE$
37250-1000 Control:	TSO-C37b Class II, Env. Cat.	$\frac{A}{D} AAAE$
	TSO-C38b Env. Cat.	$\frac{A}{D} AAAE$
Mounting 36450:	TSO Env. Cat.	$\frac{A}{D} AB----$
Mounting 36280:	TSO Env. Cat.	$\frac{A}{D} AA----$
Mounting 34980:	TSO Env. Cat.	$\frac{AA}{DB} E----$
Mounting 36320:	TSO Env. Cat.	$\frac{AA}{DB} A----$

Receiver

Circuit: Double-conversion superheterodyne

Sensitivity: 2.0 μV across input terminals at 6 dB S+N/N ratio

Agc: 4dB from 10 to 20,000 μV

Image Rejection: At least 50 dB down

I-f Rejection: At least 60 dB down

Selectivity: Total bandwidth at 6 dB: 25 KHz
Total bandwidth at 60 dB: 45 KHz

Squelch: Carrier to noise ratio; internally adjustable

Audio Response: 350 to 3000 Hz, 6 dB bandwidth

Headset Audio: Rated at 5.0 volts across 250 ohms

Transmitter

Power Output: 15 watts minimum

Modulation Capability: 85 percent to less than 100 percent

Rated Duty Cycle: 1 minute on, 4 minutes off

Audio Amplifier

Output: Rated at 10 watts into 4-ohm load

Audio Channels: Nine

1.4 UNITS AND ACCESSORIES

Table 1-1 lists the units and accessories available for a Cessna 800 Communication System installation.

TABLE 1-1. UNITS AND ACCESSORIES

Qty.	Name	Type No.	Part No.
1	Receiver-Transmitter	RT-131A	37260
1	Accessory Unit	RTA-131B	38500
1	Control Unit	C-131A	37250-0000
1	Mounting, Rigid (for 37260)*	---	36450
1	Mounting, Vibration-isolated (for 37260)*	---	36280
1	Mounting, Rigid (for 38500)*	---	34980
1	Mounting, Vibration-isolated (for 38500)*	---	36320
1	Antenna**	A-25D*	37670
		A-29C*	35180-0000***
		A-29C*	35180-0200***
2	Connector Kit, consisting of:	---	37546-0007*
		---	37546-0008*
1	Connector	---	35860-0034
33	Contact, Solder-type (supplied with 37546-0007)	---	35861-3020
33	Contact, Crimp-type (supplied with 37546-0008)	---	35861-2020
1	Polarizing Plug	---	35861-0002
1	Guide Pin	---	35862-0002
1	Guide Socket	---	35862-0001
1	Lever and Pivot Set	---	29916-0002
1	Shell	---	36048-0034
2	Connector Kit, consisting of:	---	37546-0005*
		---	37546-0006*
1	Connector	---	35860-0026
4	Contact, Solder-type (supplied with 37546-0005)	---	35861-3016
4	Contact, Crimp-type (supplied with 37546-0006)	---	35861-2016
21	Contact, Solder-type (supplied with 37546-0005)	---	35861-3018
21	Contact, Crimp-type (supplied with 37546-0006)	---	35861-2018
1	Polarizing Plug	---	35861-0002
1	Guide Pin	---	35862-0002
1	Guide Socket	---	35862-0001
1	Lever and Pivot Set	---	29916-0002
1	Shell	---	36048-0026
2	TNC Connector, Solder-type*	---	27886
2	TNC Connector, Crimp-type*	---	36608
2	MB Connector, Solder-type*	---	36798
2	MB Connector, Crimp-type*	---	36609
****2	BNC Connector, Solder-type*	---	11337
****2	BNC Connector, Crimp-type*	---	36607

*Alternative items; supplied as specified.

**Optional.

***A-29C Antenna, Part No. 35180-0000, has centered connector.

A-29C Antenna, Part No. 35180-0200, has off-center connector.

****One BNC Connector, either solder- or crimp-type, is supplied as part of communication system. One BNC Connector, for use with antenna, is optional.

1.5 EQUIPMENT REQUIRED BUT NOT SUPPLIED

Interconnecting cable assemblies are not supplied but must be fabricated from individual wires and RG-58/U coaxial cable (not supplied) and the connectors listed in Table 1-1. The wire sizes required to fabricate the interconnecting cables are specified in figure 2-9. The actual lengths of the wires and cables will depend on the location of the equipment in the aircraft.

A VHF communication antenna is required for use with the Cessna 800 Communication System. The 37670-0000 or the 35180-0100 Antenna, available on special order, is recommended, but any comparable antenna may be substituted.

1.6 DESCRIPTION OF UNITS

Receiver-Transmitter. The 37260 Receiver-Transmitter is a solid-state, remote-mounted unit which includes all the receiver circuits and the tuner portion of the transmitter. The receiver-transmitter covers the VHF communication frequencies between 116.00 and 135.975 MHz. A frequency synthesizer is used to provide 800 channels spaced .025 MHz (25 KHz) apart. The frequency synthesizer utilizes solid-state logic, digital, and linear circuits to produce the selected transmitter r-f frequency and the corresponding receiver local oscillator signal. Seven microcircuit networks are used in the i-f and audio circuits of the receiver.

The receiver circuit provides an aural output for headset operation and the receiver-transmitter includes circuitry for connecting nine audio outputs through the accessory unit for speaker amplification. A crystal-controlled self-test circuit produces signals for testing most of the receiver and the transmitter circuits. Electrical connections to the receiver-transmitter are made through four connectors on the front of the unit.

Accessory Unit. The 38500 Accessory Unit is a remote-mounted, all transistorized unit which includes all of the transmitter circuits except the tuner. It also includes a modulator-amplifier circuit which functions as a modulator during transmit condition, and as a speaker amplifier during receive condition. Regulator circuits provide regulated voltages for the receiver and the transmitter, and a transient protector switch circuit protects most of the circuits of the set from transient voltages on the primary input line.

A coaxial relay in the accessory unit permits the use of a common antenna for reception and transmission, and a signal sensor and delay circuit prevents the application of an r-f signal to the transmitter until the antenna has been switched to the transmitter circuits. A SWR detector circuit samples the VSWR of the antenna circuit and turns off the transmitter when the antenna circuit presents an improper load. Electrical connections to the accessory unit are made through four connectors on the front of the unit.

Control Unit. The 37250-1000 Control Unit provides remote control of the Cessna 800 Communication System. Power for the communication system and the audio output level (volume) of the receiver are controlled by an on-off switch combined with a variable resistor. The receiver-transmitter operating frequency is selected by two frequency selector controls and displayed by a digital readout indicator.

A toggle switch selects the self-test feature for the receiver or the transmitter circuits, and a test lamp provides an indication of circuit operation. The test lamp also provides a modulation indicator during normal transmissions. The plastic panel of the control unit is edge-lighted by six subminiature lamps. All electrical connections to the control unit are made through a connector on the back of the unit.

Mountings. Either Mounting 36450, a rigid mounting, or Mounting 36280, a vibration-isolated mounting, is used to secure the receiver-transmitter to the airframe. The accessory unit requires either Mounting 34980, a rigid mounting, or Mounting 36320, a vibration-isolated mounting. The units are secured by a nut-and-clamp arrangement on the front of the mountings. Flexible metal straps on the bottom of the 36280 and 36320 mountings are used to bond the unit and the mounting to the airframe.

SECTION II

INSTALLATION

2.1 UNPACKING

Remove all packing material from the packing case and carefully remove the units. Inspect each unit for damage. Check the units and accessories against the packing slip to be sure all items have been received and removed from the packing case.

2.2 PREINSTALLATION TESTS

Before installation, the communication system should be bench tested for overall performance. To bench test the communication system, interconnect the units as shown in figure 2-9, and proceed as follows:

NOTE

Equivalent test equipment may be substituted for any specified.

- a. Connect a Hewlett-Packard Model 608D Signal Generator through a Boonton Radio Type 505-B Attenuator to antenna connector J4 of accessory unit. Set 608D for output of 3 μ V at 135.95 MHz, with 30 percent modulation of 1 KHz.
- b. Connect Ballantine Model 300D VTVM to "phone out" (terminal P, J2) of receiver-transmitter.
- c. Apply power to the communication system.
- d. Select 135.95 MHz on control unit MHz and FRACT MHz controls.
- e. Adjust volume control on control unit for approximately 3.2 volts (10 dB) indication on 300D.
- f. Remove modulation from 608D. Model 300D should indicate drop of greater than 6 dB.
- g. Reconnect 300D across speaker.
- h. Readjust 608D for 20 μ V signal with 30 percent modulation of 1 KHz. Model 300D should indicate at least 5 volts ac.
- i. Disconnect 608D, 505-B, and 300D.
- j. Connect a Bird Electronic Model 61 Wattmeter through a linear detector to antenna connector J4 of the accessory unit. Connect a Tektronix Model 310A Oscilloscope to side port of linear detector. Connect a Hewlett-Packard Model 200AB Audio Oscillator to "mike audio" input (terminal A, J1) of accessory unit.
- k. Adjust 200 AB for output of 1000 Hz at 1 volt.
- l. On control unit MHz and FRACT MHz controls, select 118.000, 126.500 and 135.975 MHz in succession. Key transmitter at each selected position. Model 61 should indicate a minimum of 15 watts and 310A should indicate at least 85 percent modulation for each frequency selected.

- m. Increase output of 200AB to 2.5 volts, and recheck transmitter output at 118.000, 126.500 and 135.975 MHz. Model 61 should indicate a minimum of 15 watts and 310A should indicate more than 90 percent but less than 100 percent modulation for each frequency selected.
- n. Disconnect 61, 310A and 200AB.

2.3 INSTALLATION REQUIREMENTS

The location and installation of the communication system may vary with each aircraft; however, the following general requirements are applicable to all aircraft.

- a. Check that the proposed installation areas can accommodate the units. Refer to the installation dimensions in figures 2-1 through 2-5 and figures 2-7 and 2-8.
- b. Install the units in an area where they will be accessible for inspection and maintenance but not subject to excessive heat, vibration, or noise generating sources. Install the control unit in an area convenient to the operator.
- c. Allow at least 3 inches at the front of the receiver-transmitter and the accessory unit and 2 inches at the rear of the control unit to accommodate the electrical cables. Make no sharp bends in the wiring. Do not run cables where they may be subjected to chafing or excessively high temperatures.
- d. To ensure proper antenna grounding, use internal- or external-tooth lockwashers under the head of each mounting screw and tighten screws securely, particularly if a weather seal is used.
- e. Length of coaxial antenna cable is critical. Refer to figure 2-9 for cable information.

2.4 INSTALLATION OF RECEIVER-TRANSMITTER AND MOUNTING

Installation dimensions for the receiver-transmitter installed on its mounting are shown in figures 2-1 or 2-2. To install the receiver-transmitter and mounting, refer to figure 2-1 or 2-2, as applicable, and proceed as follows:

- a. Use bottom plate of mounting as a template to locate mounting holes.
- b. Drill required number and size of holes in mounting surface. Remove paint and clean the surface around holes to ensure proper bonding.
- c. Secure mounting with binding head screws, lockwashers and nuts.
- d. Place receiver-transmitter on mounting. Position clamp and tighten knurled nut to secure unit in position.

2.5 INSTALLATION OF ACCESSORY UNIT AND MOUNTING

Installation dimensions for the accessory unit installed on its mounting are shown in figures 2-3 and 2-4. To install the accessory unit and mounting, refer to figure 2-3 or 2-4, as applicable, and proceed as follows:

- a. Use bottom plate of mounting as a template to locate mounting holes.
- b. Drill required number and size of holes in mounting surface. Remove paint and clean the surface around holes to ensure proper bonding.
- c. Secure mounting with binding head screws, lockwashers and nuts.
- d. Place accessory unit on mounting. Position clamp and tighten knurled nut to secure unit in position.

2.6 INSTALLATION OF CONTROL UNIT

The control unit is designed for mounting on a 1/16-inch thick panel. Panels of other thicknesses require the use of the adapter plate supplied with the unit. Installation dimensions for the control unit are shown in figure 2-5. Assembly details, with and without the adapter plate, are shown in figure 2-6.

2.7 INSTALLATION OF ANTENNA

Installation dimensions for the optional 37670-0000 Antenna are shown in figure 2-7. Installation dimensions for the optional 35180-0100 Antenna are shown in figure 2-8. In general, keep the antenna symmetrical with the centerline of the aircraft and locate it in an area as far away as possible from other antennas, lead-in wires, and guy wires.

2.8 INTERCONNECTION OF UNITS

An interconnection diagram for a Cessna 800 Communication System installation is shown in figure 2-9. Terminate cables and wiring as shown.

2.9 POSTINSTALLATION CHECK

No postinstallation adjustments of the communication system are necessary, but a postinstallation check should be performed to verify its operation. Refer to the operating procedures in Section III for use of the self-test feature, and check the equipment by contacting the base station or local communication facility on several channels.

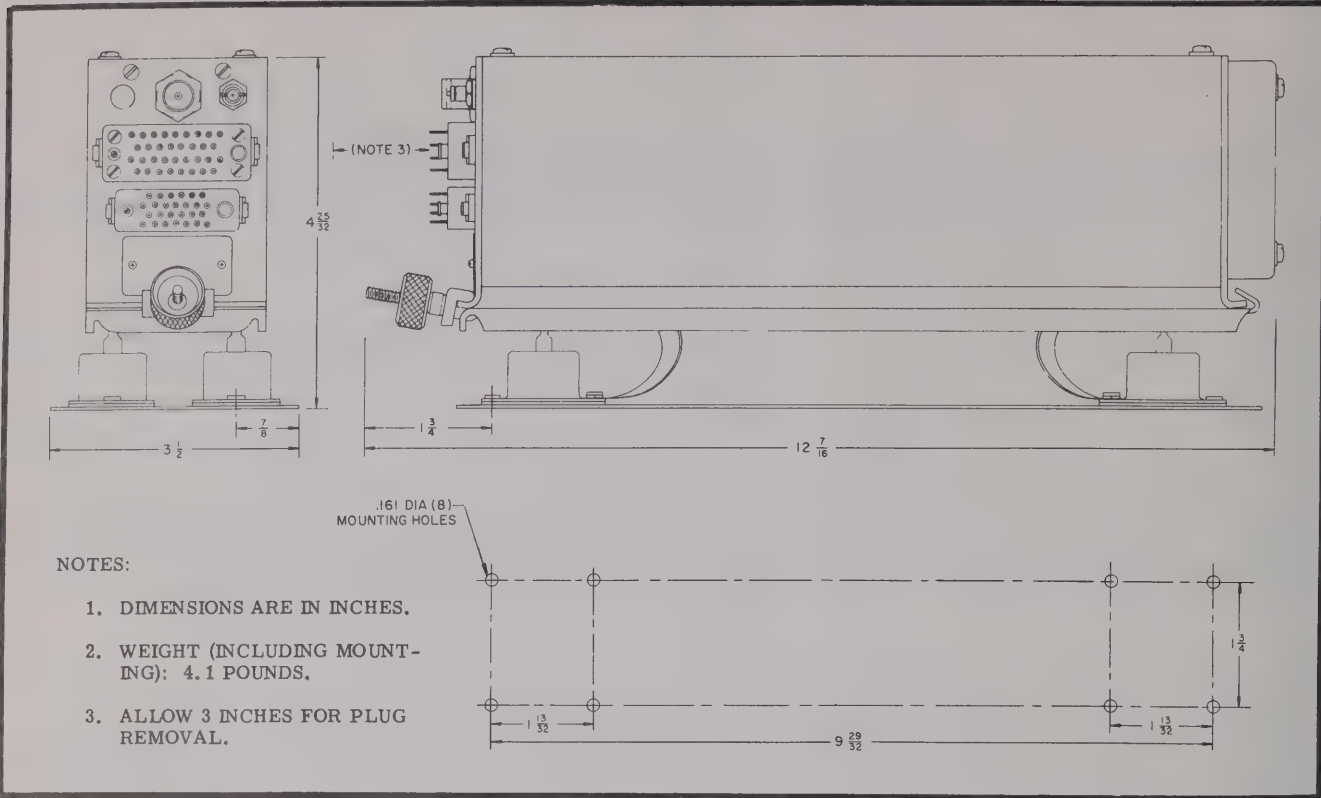


Figure 2-1. 37260 Receiver-Transmitter with Mounting 36280, Installation Dimensions

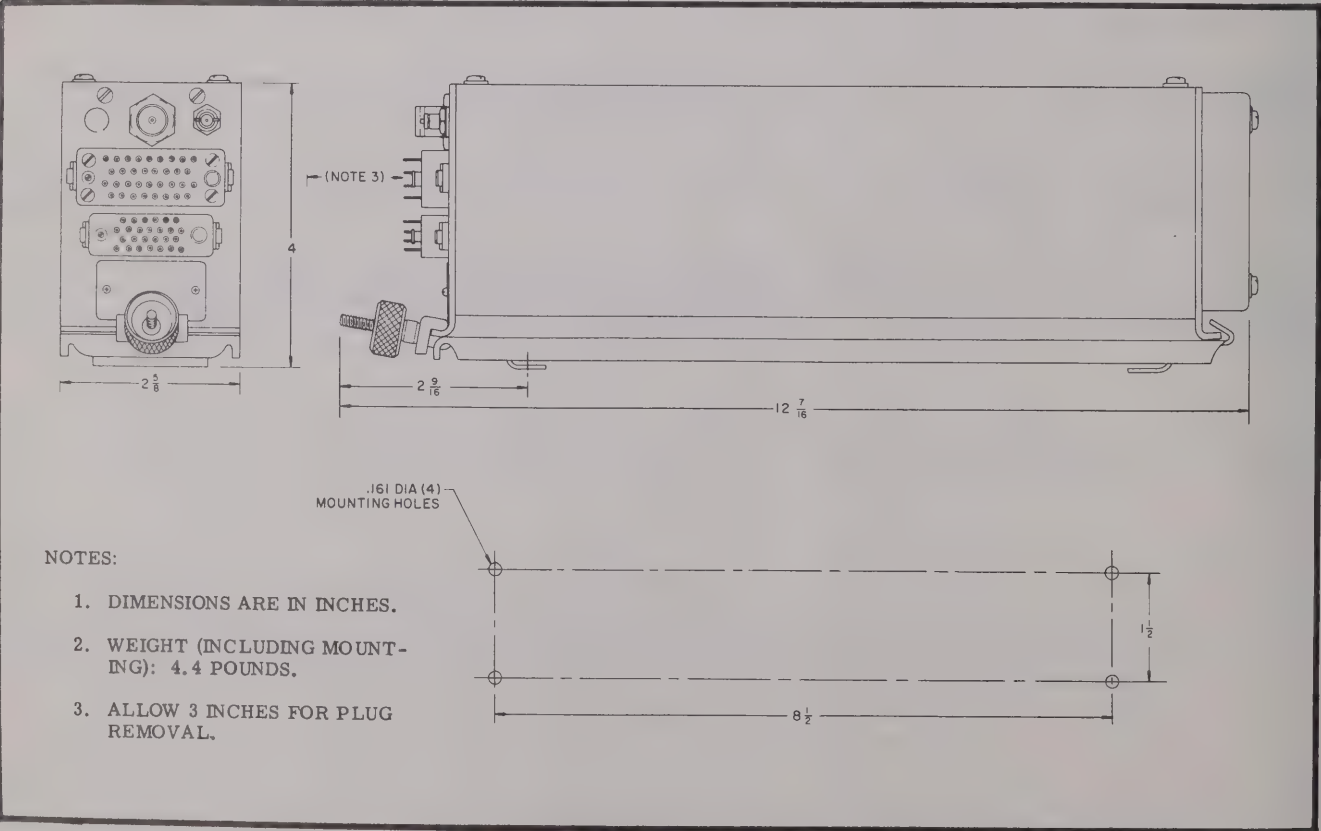


Figure 2-2. 37260 Receiver-Transmitter with Mounting 36450, Installation Dimensions

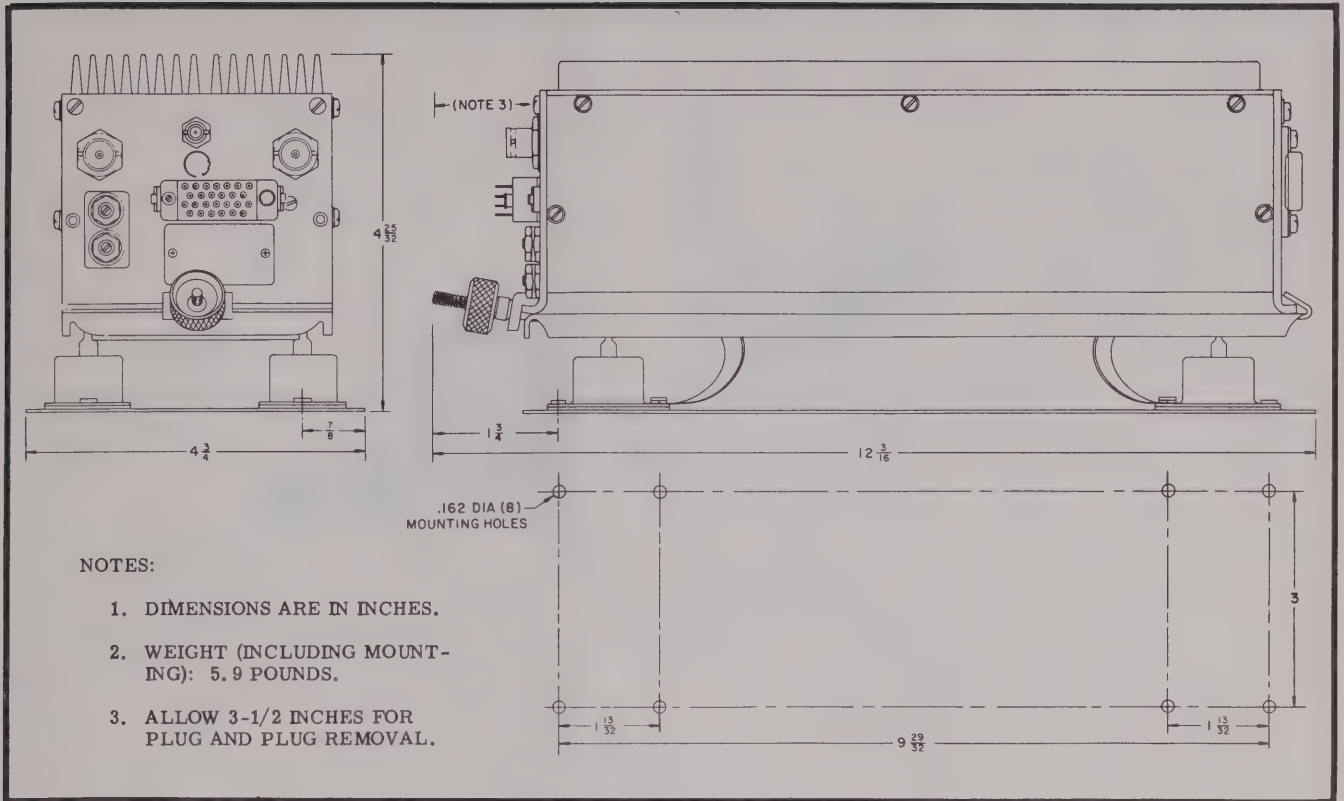


Figure 2-3. 38500 Accessory Unit with Mounting 36320, Installation Dimensions

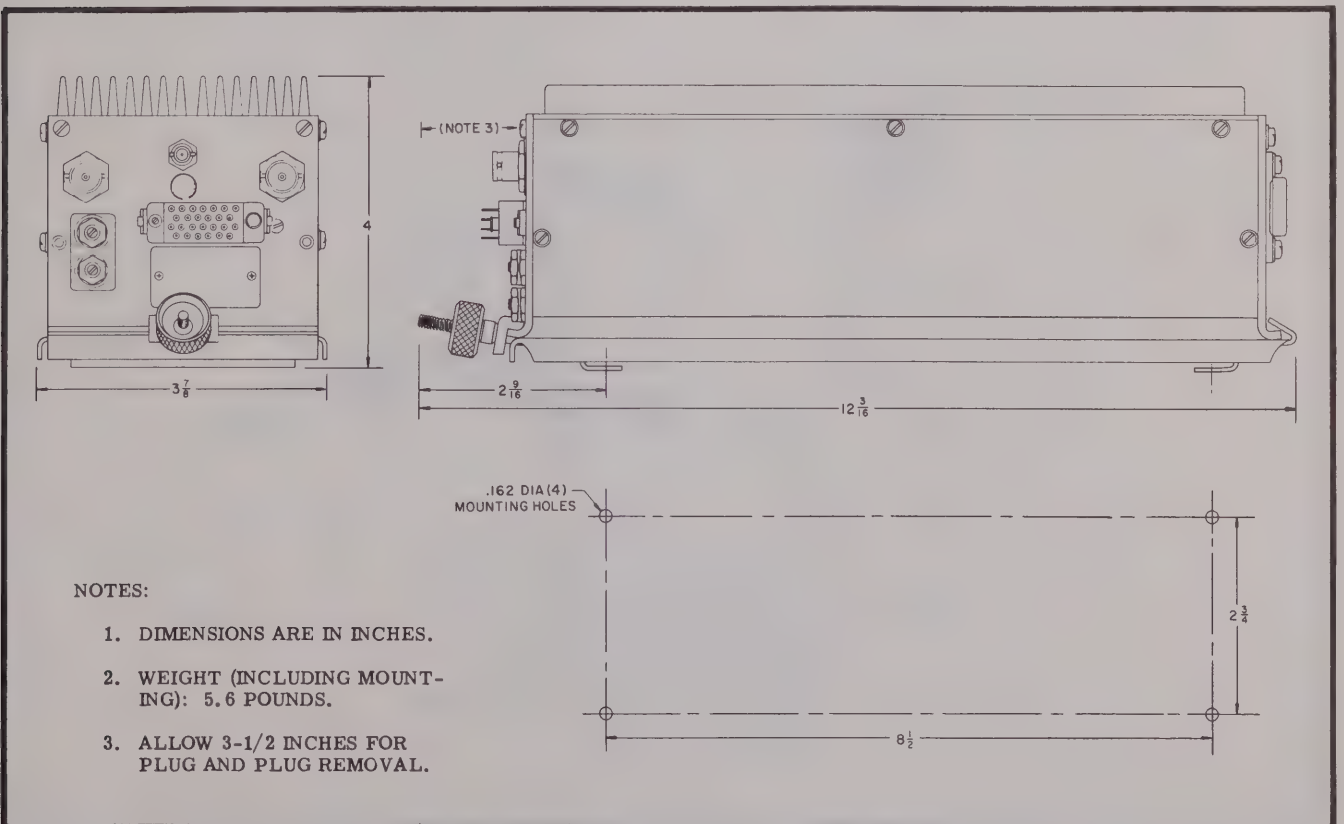
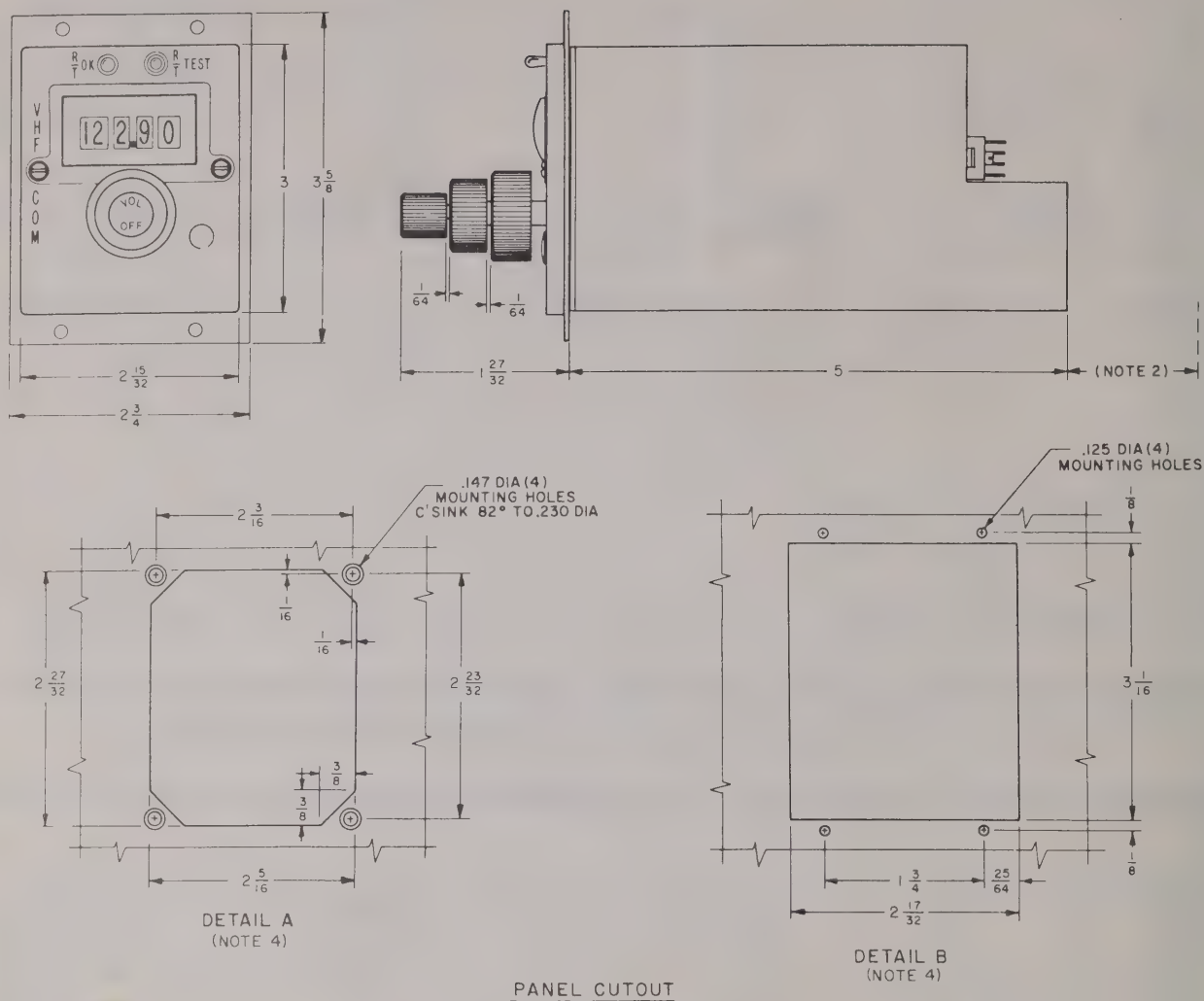


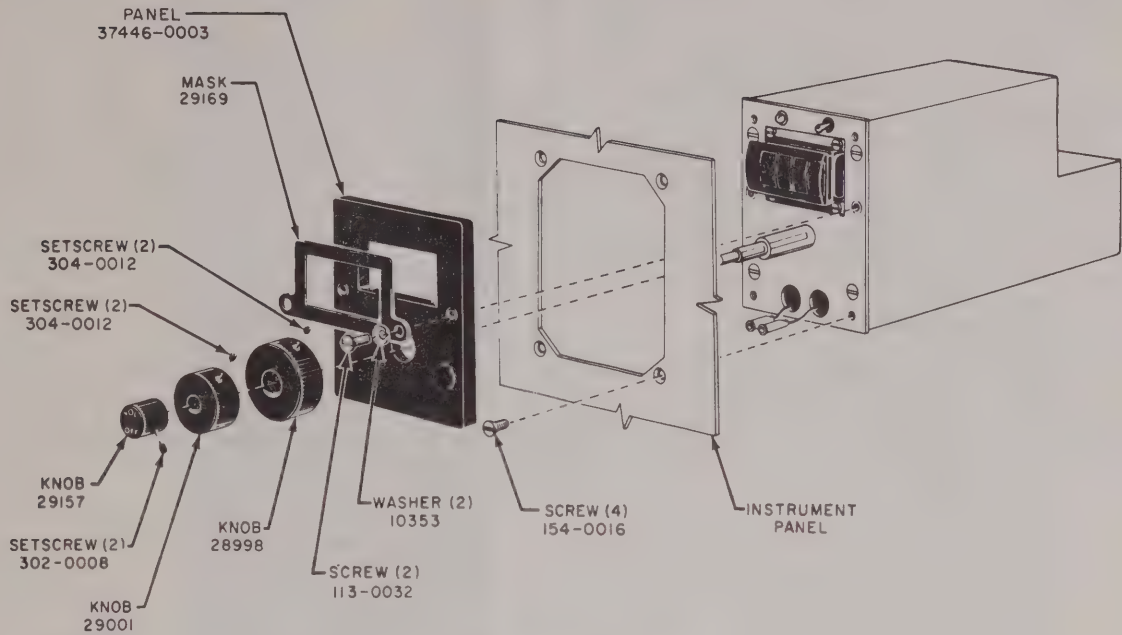
Figure 2-4. 38500 Accessory Unit with Mounting 34980, Installation Dimensions



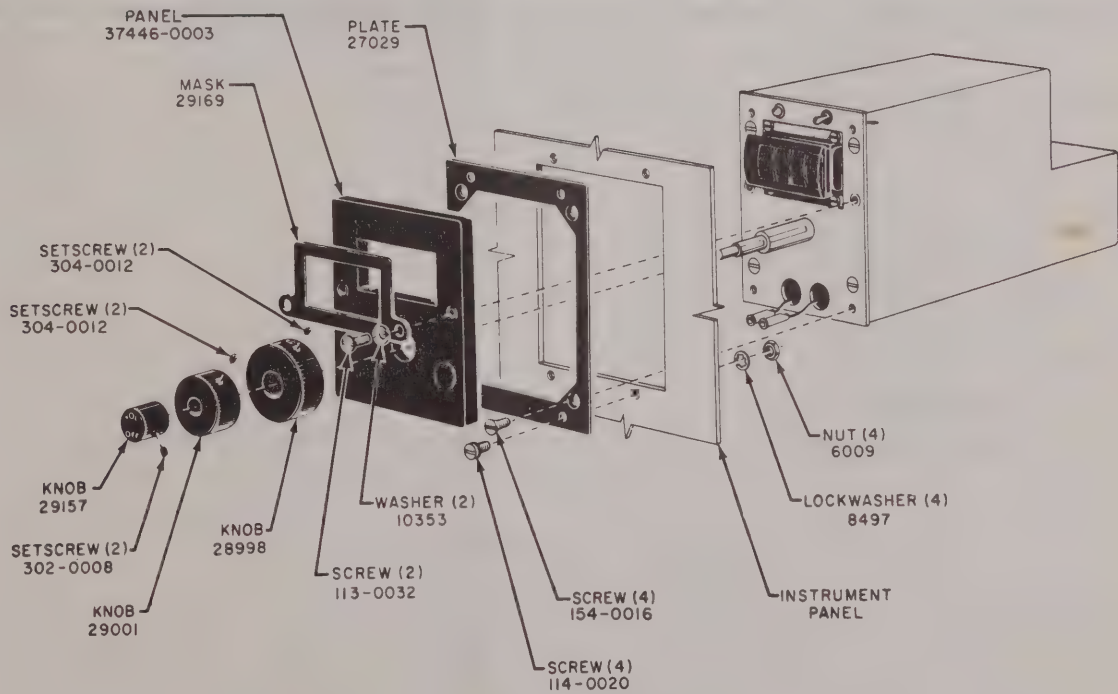
NOTES:

1. DIMENSIONS ARE IN INCHES.
2. ALLOW 3 INCHES FOR CABLE BEND.
3. WEIGHT: 1.4 POUNDS.
4. 37250-1000 MOUNTS DIRECTLY ON 1/8 INCH INSTRUMENT PANEL. UNIT REQUIRES ADAPTER PLATE IF PANEL IS OF ANY OTHER THICKNESS. USE CUT-OUT DIMENSIONS, DETAIL A, FOR DIRECT PANEL MOUNTING. USE CUT-OUT DIMENSIONS, DETAIL B, FOR MOUNTING UNIT WITH ADAPTER PLATE.

Figure 2-5. 37250-1000 Control Units, Installation Dimensions



WITHOUT ADAPTER PLATE



WITH ADAPTER PLATE

Figure 2-6. 37250-1000 Control Unit, Assembly Details

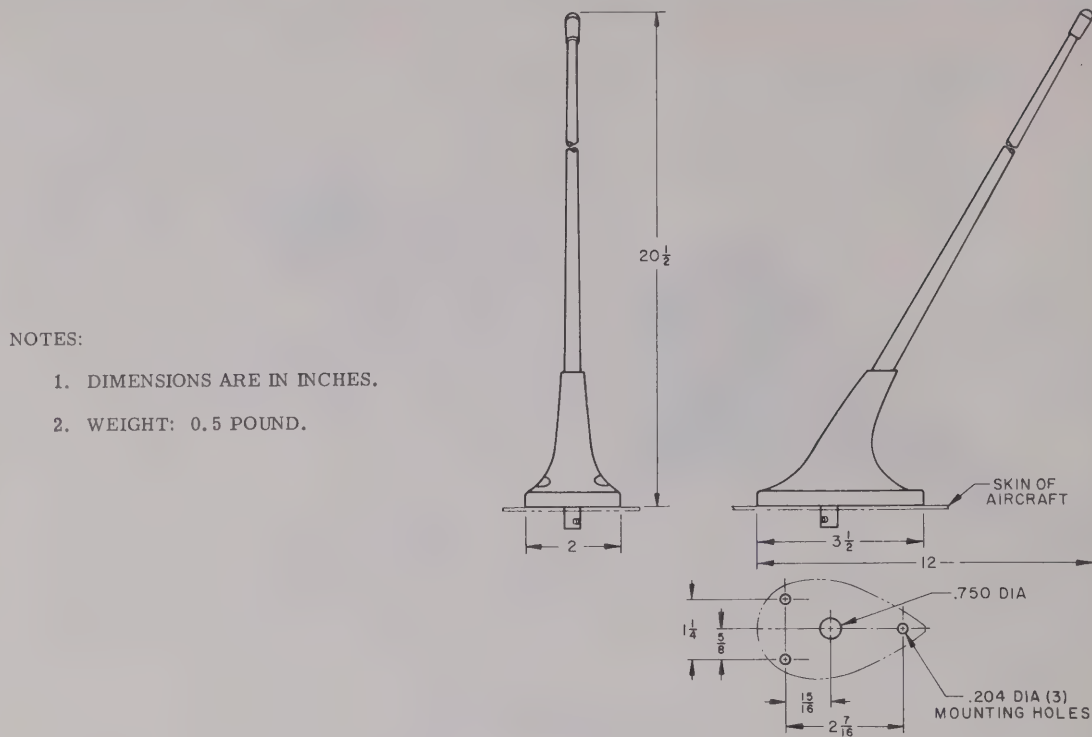


Figure 2-7. 37670-0000 Antenna, Installation Dimensions

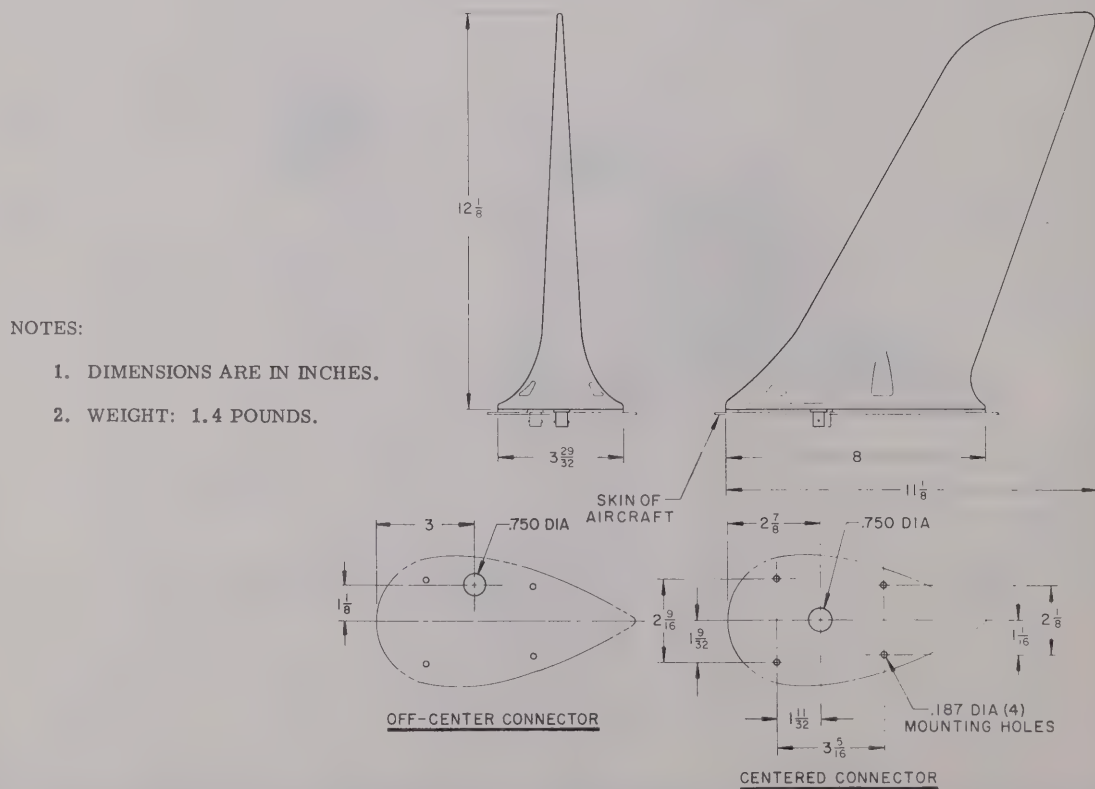
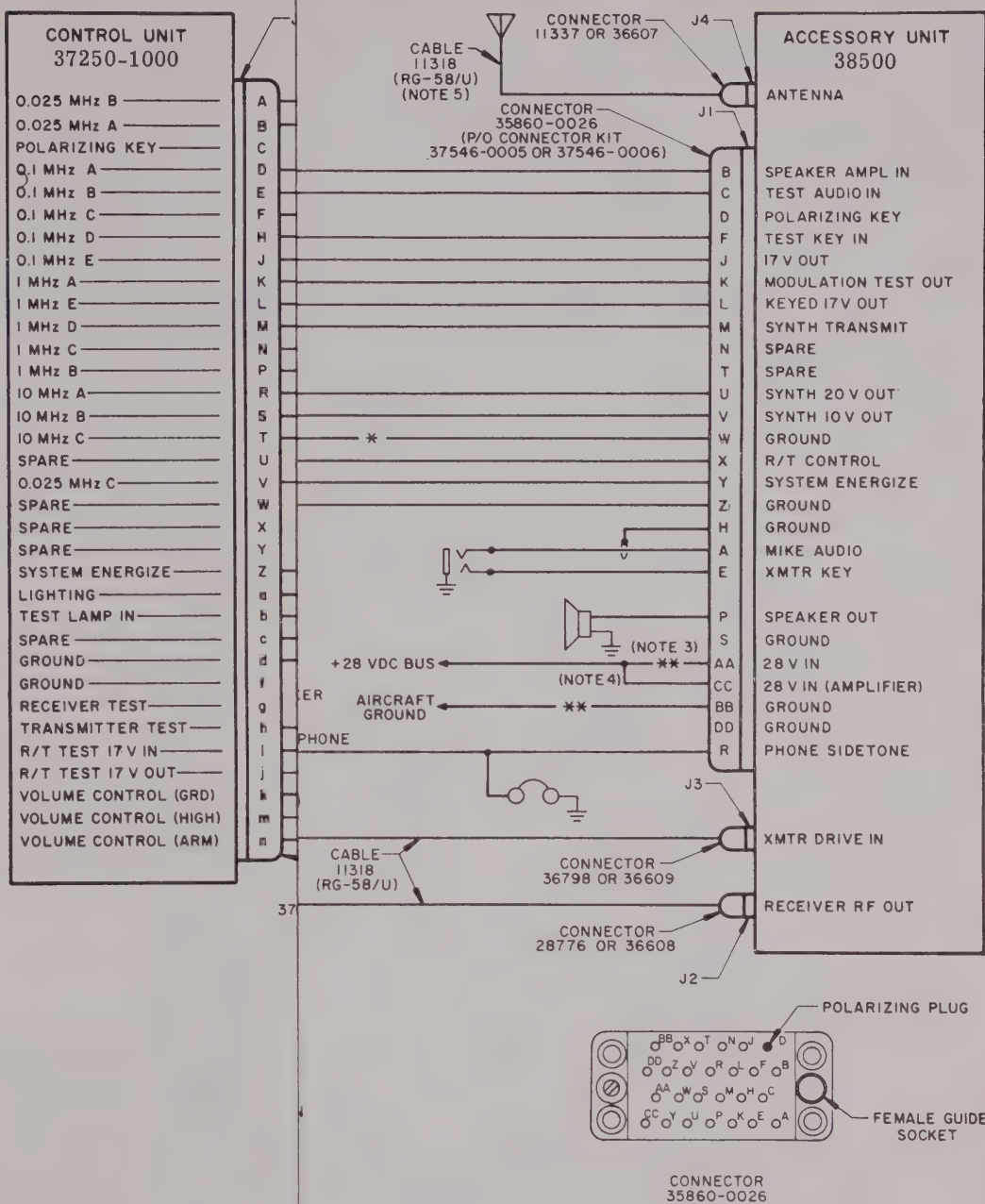
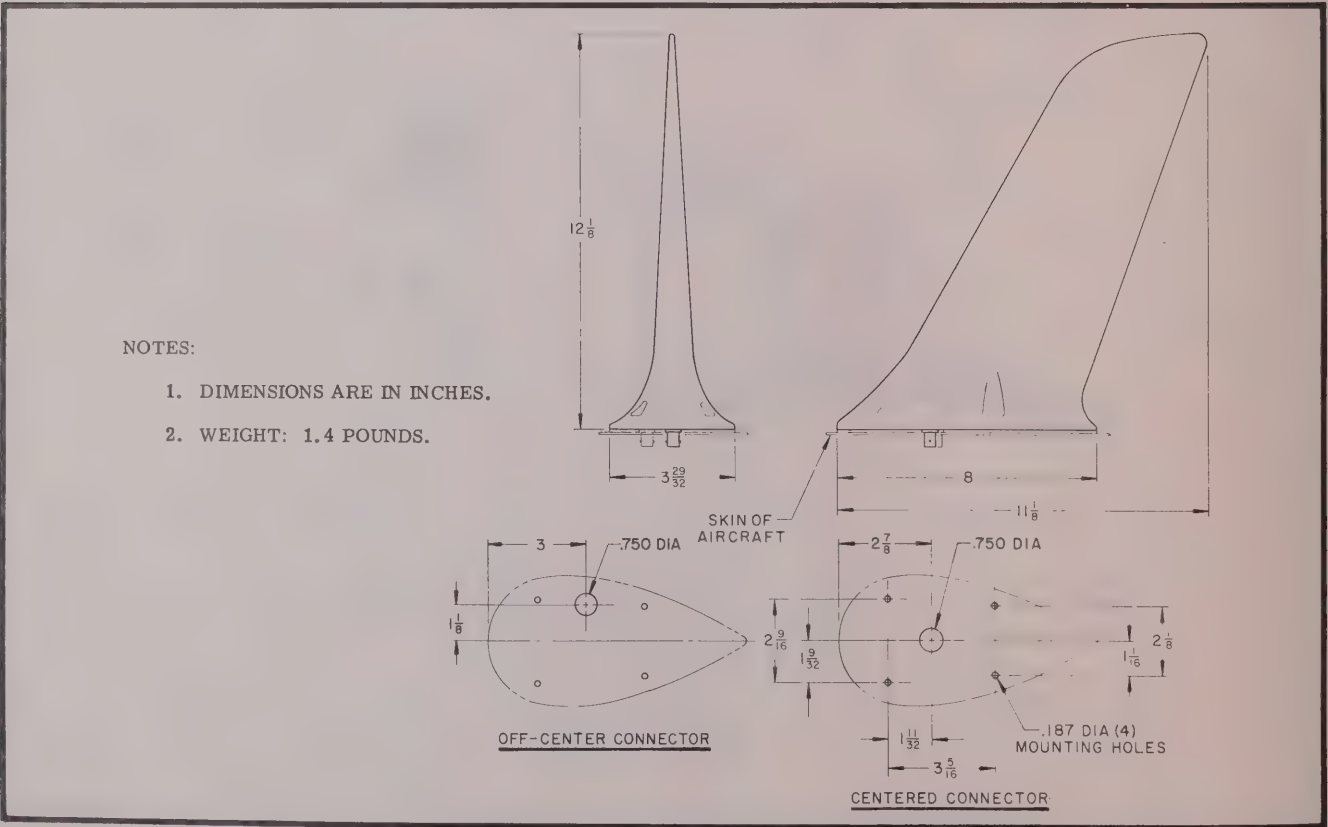
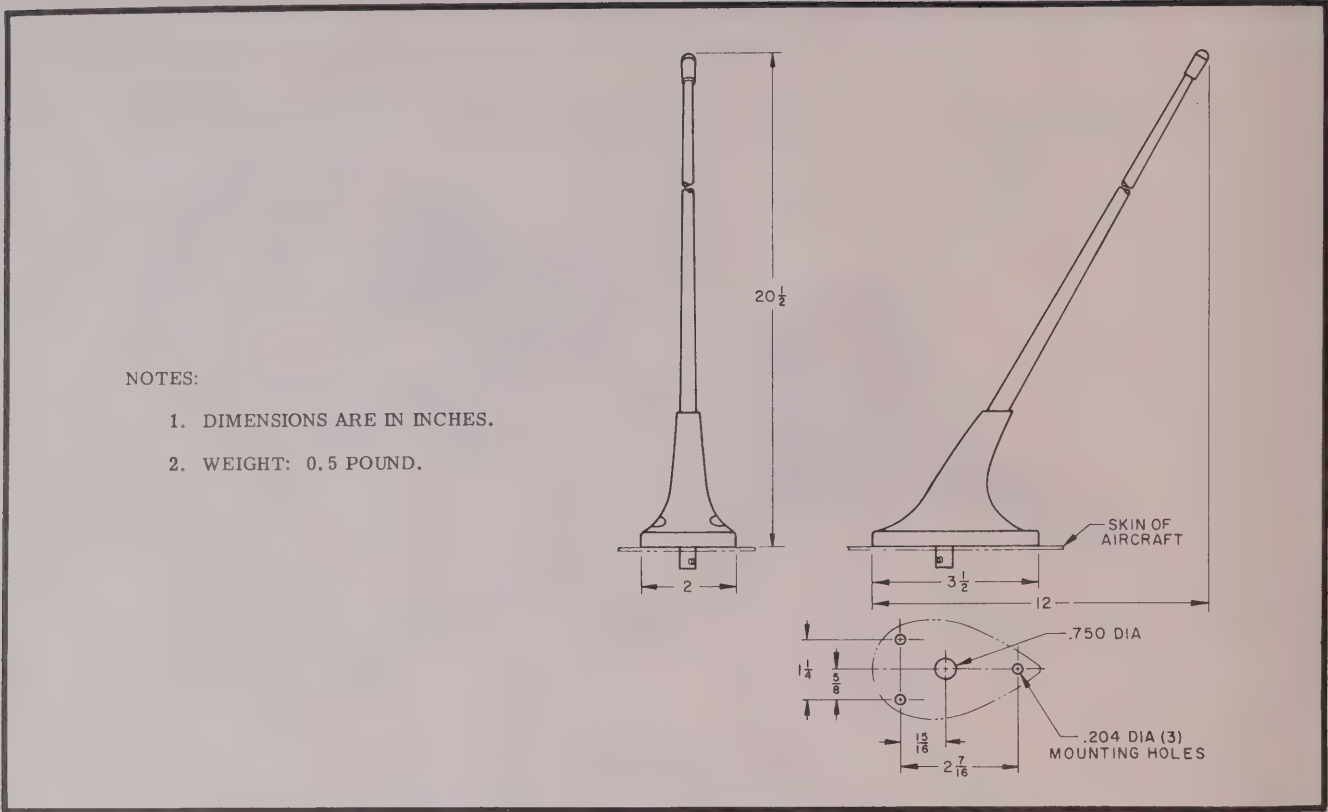


Figure 2-8. 35180-0100 Antenna, Installation Dimensions



ation System, Interconnection Diagram



2-9 / 2-10

SECTION III

OPERATION

3.1 OPERATION CONTROLS

Operating controls and indicators for the communication system are located on the 37250-1000 Control Unit (figure 3-1). Table 3-1 lists the designations and describes the functions of the controls and indicators.

NOTE

The MHz and FRACT MHz designations are not marked on the front panel.

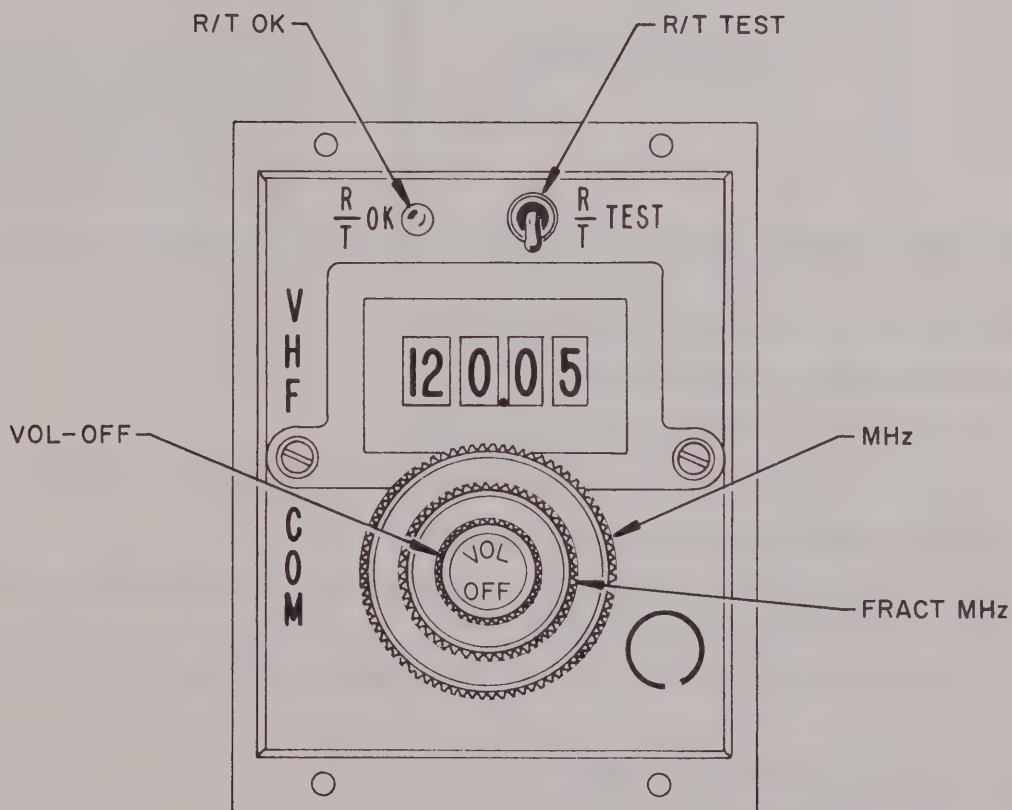


Figure 3-1. 37250-1000 Control Unit

TABLE 3-1. OPERATING CONTROLS AND INDICATORS

Designation	Control or Indicator	Function
VOL-OFF	Primary Power and Receiver Volume Control	Combined primary power and volume control. Clockwise rotation applies power. Further clockwise rotation increases audio level.
MHz	Receiver-Transmitter Megahertz Selector	Selects receiver-transmitter frequency in 1-MHz steps between 118 and 135 MHz.
FRACT MHz	Receiver-Transmitter Fractional Megahertz Selector	Selects receiver-transmitter frequency in .025-MHz steps between .000 and .975 MHz.
R/T TEST	Receiver or Transmitter Self-Test Selector	Selects self-test function for receiver or transmitter.
R/T OK	Self-Test Indicator and Transmitter Modulation Indicator	When R/T TEST selector is set to R or to T, indicates proper operation when light glows steadily; indicates receiver or transmitter malfunction when light flashes. When transmitter is keyed for normal operation, lamp brilliance varies with modulation.

3.2 COMMUNICATION OPERATING PROCEDURES

For communication operation, proceed as follows:

- Turn VOL-OFF control clockwise to apply power.
- Rotate MHz and FRACT MHz controls to select the desired operating frequency.
- Adjust volume control for comfortable audio level.
- To transmit, depress microphone button. Speak into microphone; R/T OK lamp should light and brilliance should vary with voice modulation.
- To receive, release microphone button. Audio signals should be heard on headset or speaker.

3.3 SELF-TEST OPERATING PROCEDURES

For self-test operation of the receiver or the transmitter, proceed as follows:

- Turn VOL-OFF control clockwise to apply power.

- b. To test transmitter, hold R/T TEST switch in "T" position. When the transmitter is functioning properly, R/T OK lamp will glow steadily. When a malfunction is present in the transmitter circuit, R/T OK lamp will flash intermittently.
- c. To test receiver, hold R/T TEST switch in "R" position. When receiver is functioning normally, R/T OK lamp will glow steadily and an audio tone (of approximately 1000 Hz) will be heard on headset or speaker. When a malfunction is present in the receiver, R/T OK lamp will flash intermittently and no audio tone will be heard.
- d. Release R/T TEST switch for normal communication operation.



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